

REMARKS/ARGUMENTS:

Claims 1, 2, and 6 are amended. Support for the amendment to claim 1 can be found in Figs. 2 and 3 and at paragraph [0027] (i.e., p. 17, line 24-p. 18, line 22) of Applicant's specification. Claims 1-23 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka et al. (U.S. Patent Application Publication No. 2001/0042746) in view of Radmacher (U.S. Patent No. 5,993,722). Applicant respectfully traverses this rejection. Claim 1, as amended, is as follows:

A ceramic heater comprising;  
a first and second elongate ceramic body; and  
a heat generating resistor,  
wherein the heat generating resistor is between the first  
and second elongate ceramic bodies,  
wherein a plurality of parts of the heat generating  
resistor are arranged in a longitudinal direction along  
boundaries between the first and second elongate ceramic  
bodies, each part having two sides,  
wherein the thickness of the heat generating resistor  
changes when viewed from a section perpendicular to the  
longitudinal direction,  
wherein an angle of an edge of said heat generating  
resistor is 60° or less between the two sides, when viewed from  
the section perpendicular to the longitudinal direction of said  
heat generating resistor.

Applicant respectfully submits that the differences between the subject matter of claim 1 and the cited references are such that the subject matter as a whole would not have been obvious at the time the invention was made to a person of ordinary skill in the art. Applicant submits that the cited references do not teach

or suggest a "ceramic heater" according to claim 1 having the limitations "wherein the thickness of the heat generating resistor changes when viewed from a section perpendicular to the longitudinal direction" or "wherein an angle of an edge of said heat generating resistor is  $60^\circ$  or less between the two sides, when viewed from the section perpendicular to the longitudinal direction of said heat generating resistor."

It is an aspect of the present invention that the heat generating resistor 4 is formed such that at least one portion of the edge thereof is tapered. FIG. 2 (reproduced below) is a sectional view schematically showing a cross section that is perpendicular to the longitudinal direction of the ceramic heater 1. As shown in FIG. 2, the heat generating resistor 4 is buried in the ceramic bodies 2 and 3. The edge of the heat generating resistor tapers off toward the distal end. FIG. 3 (reproduced below) is a partially enlarged sectional view of a portion near an edge 10 of the heat generating resistor 4. As shown in FIG. 3, the edge 10 of the heat generating resistor 4 tapers off toward the distal end, and the angle  $\phi$  of the edge of the heat generating resistor is  $60^\circ$  or less. (Applicant's specification, at p. 17, line 24-p. 18, line 12).

FIG. 2

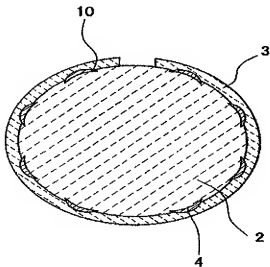
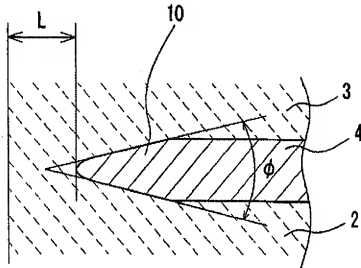


FIG. 3



In contrast, Tanaka fails to teach or suggest that the thickness of the heat generating resistor changes when viewed from a section perpendicular to the longitudinal direction, because FIG. 11 (reproduced below) of Tanaka shows that a thickness of the heating element 4 is constant and does not change along the boundary between the ceramic core 2 and the ceramic green sheet 3.

In addition, Tanaka fails to teach or suggest that an angle of an edge of said heat generating resistor is  $60^\circ$  or less between the two sides, when viewed from the section perpendicular to the longitudinal direction of said heat generating resistor, because FIG. 11 of Tanaka shows that the angle of the edge of the heating element 4 is near  $180^\circ$  in the cross section perpendicular to the longitudinal direction of the ceramic heater device.

In the ceramic heater manufactured on the basis of Tanaka and Radmacher, a cross section sectioned along a longitudinal axis of the ceramic heater device is reduced in the proximity of the tip 22 to increase the resistance in this region and hence the heat produced by the ceramic heater. Therefore, a thickness of the heat generating resistor increases as the distance from the tip 22 along the longitudinal axis of the ceramic heater device increases. Thus, in the portion departing from the

tip 22 along the longitudinal axis, the heat produced by the ceramic heater does not increase.

In contrast, in the present invention, although the thickness of the heat generating resistor changes when viewed from a section perpendicular to the longitudinal direction, the thickness of the heat generating resistor does not change in a cross section sectioned along a longitudinal axis of the ceramic heater device. The heat produced in the tip of the ceramic heater device is the same as that in the portion departing from the tip. As a result, a uniform heating can be effected, and an area for use in heating is large.

In addition, in Tanaka, in order that the inner resistive volume be shielded from oxidization, a cross section is reduced in the proximity of the tip 22, while, in the present invention, in order to prevent cracks and wire breakage from occurring, an angle of an edge of the heat generating resistor is 60° or less. Therefore, a purpose of reducing a cross section in the edge of the heat generating resistor in the present invention differs from that of Tanaka.

In light of the foregoing, Applicant respectfully submits that cited references cannot render claim 1 obvious, because the cited references fail to teach or suggest each and every claim limitation. Claims 2-6 depend from claim 1 and therefore, cannot be rendered obvious over the cited references for at least the same reasons as claim 1. Withdrawal of this rejection is thus respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 595-3107 to discuss the steps necessary for placing the application in condition for allowance.

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Amdt. Dated February 10, 2010  
Reply to Office Action of November 10, 2010

Attorney Docket No. 374611-000120  
Customer No.: 73230

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 07-1896.

Respectfully submitted,

DLA PIPER LLP (US)

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